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DRAWINGS ATTACHED

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(54) TRANSFER MATERIALS

(71) We, LETRASET INTERNATIONAL LIMITED, (formerly Letraset Limited), a British Company, of St. George's House, 195—203 Waterloo Road, London, S.E.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to transfer materials suitable for application under heat and pressure to fabric and like substrates.

According to the present invention there is provided a transfer material which comprises a non-thermoplastic carrier sheet and, in order thereon, an overall layer of thermoplastic, water-insoluble film, an ink design in an ink based on a thermoplastic resin and, localised on the surface of the assembly at an edge thereof, an area of non-transferable, non-theromplastic material. The thermoplastic water-insoluble film may be, for example, polyethylene or a nylon. Polyethylene is most preferred.

According to a further feature of the invention a method of applying a design to a fabric comprises applying to the fabric a transfer material as just defined, with the carrier sheet outermost, applying heat and pressure over the area and then, while the assembly is still hot, stripping away the carrier sheet.

The heat and pressure may be applied by a domestic smoothing iron or by its mechanically operated equivalent. The thermoplastic resin of the design ink melts and so sticks the design to the fabric surface, with some degree of penetration into the fibres of the fabric material. The thermoplastic water-insoluble film layer also melts and accordingly makes it possible to strip away the carrier sheet. Usually some of the film layer comes away with the carrier sheet but the major part in the region of the design, remains adherent to the design and so provides a protective surface over the transferred design.

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Because the thermoplastic water-insoluble film layer in regions outside the design will also tend to adhere to the fabric it would normally be difficult to pick up an edge of the carrier sheet in order to strip it away. To avoid this there is included localised at one edge, as noted above, a layer of a non-transferable, non-thermoplastic material. The assembly does not stick to the fabric at that area so that it affords an edge portion at which the carrier sheet may be picked up by the fingers. If desired this non-transferable non-thermoplastic material may be pigmented or coloured to render it readily visible.

In a preferred modification of the transfer material there is applied a clear thermoplastic or thermosetting resin layer between the ink design and the thermoplastic water-insoluble film layer: this may be an overall layer or a layer in the area of the design only.

A transfer material according to the invention may thus have an arrangement of layers as shown in section in the drawing accompanying the provisional specification where the carrier sheet 1 has a polyethylene layer 2 coated on it and this in turn carries, in the shape of a desired design, a clear thermoplastic or thermosetting resin layer 3 and a thermoplastic ink design layer 4. A local area of non-transferable, non-thermoplastic material 5 is provided at one edge. On transfer, under heat and pressure the layers 4 and 3 adhere to the fabric and some of layer 2 also adheres — but not in the region of layer 5 (which does not adhere). While the assembly is still hot the carrier sheet is grasped at the area of layer 5 and stripped away leaving layers 4, 3 and part of layer 2 adherent to the fabric.

Clearly if the assembly, after being pressed onto the fabric, is allowed to cool too far the polyethylene layer will reharden and it is then not possible to strip away the carrier sheet. Accordingly it is necessary to effect the stripping operation very shortly after the heat and pressure are removed from the

assembly. Generally it has been found that such a pressure applied for 2 to 30 seconds is sufficient but of course it depends on the actual materials used, the thickness of the layers and the temperature and pressure applied.

Referring more specifically to the transfer material itself, the carrier sheet must of course not be thermoplastic itself. A sheet having good release properties is very suitable, e.g. a bleached plasticised glassine paper material. The polyethylene layer is preferably a low density polyethylene and is applied to give a matt surface. Suitable assemblies of carrier sheet with a polyethylene layer thereon are commercially available for other purposes e.g. the material sold under the Trade Mark GLORYTHENE by Wiggins Teape Ltd.

The clear layer of thermoplastic or thermosetting resin, if used, is preferably a synthetic linear polyamide resin such as that sold under the Trade Mark WOLFAMIDE by Victor Wolf Co. Ltd. Other materials which can be used are other synthetic linear polyamide and polyimide resins, the materials sold under the Trade Marks VERSAMID and VERSALON, acrylic and methacrylic resins of both thermoplastic and thermosetting types, or cellulose derivatives such as cellulose acetate butyrate.

The basis of the design ink may be any of the thermoplastic materials just mentioned, and is preferably a synthetic linear polyamide. Of course the ink will generally include pigments and/or dyes.

The non-transferable, non-thermoplastic layer is preferably based on a cellulose derivative such as cellulose nitrate or ethyl hydroxyethyl cellulose but others such as starch or casein may analogously be used.

It is to be observed that if for any reason the applied assembly is allowed to cool too much after the removal of heat and pressure, so that the carrier sheet cannot be readily stripped away, the situation is remedied merely by applying further heat, no harm being done to the successful operation of the process.

Designs may be transferred by the method of this invention onto any fabric surface but the invention is of particular value where the receptor material is a fine woven fabric of linen, poplin, or poplin/Terylene admixtures (TERYLENE is a Registered Trade Mark). Naturally the temperature used must not be such as to damage the fabric to which the design is being applied: temperatures in the range of 150—220°C are generally found suitable. The pressures need only be low e.g. 5 to 50 lbs per square inch.

The following example will illustrate the construction of a transfer material according to the invention. The parts given are by weight.

EXAMPLE

A plasticised bleached glassine paper of weight 60 g/sq metre is provided with a coating of low density polyethylene at a coating weight of 20 g/sq metre.

There is applied to the polyethylene surface a clear resin layer from the following composition:

	parts
Polyamide resin (WOLFAMID 6H)	20
Toluene	56
Isopropyl alcohol	24

An ink image is then applied. An ink suitable for application by gravure printing has the following composition:

	parts
Versamid 735 (Polyamide resin) (ex Cray Valley Products Ltd)	12
Irgalite Blue BGL (ex J. R. Geigy A.G.) pigment	15
Isopropyl alcohol	21

For application by screen process printing the following ink is used:

	parts
Versamid 735	30
Methyl isobutyl carbinol	30
Ethylene glycol monomethyl ether	15
Diethylene glycol mono ethyl ether	5
Rubine Toner B.S.	20

There is locally applied close to the margin of the polyethylene coated sheet, a patch of non-transferable material. This, if applied by gravure printing may be:

	parts
nitrocellulose 60/330 (ex Sonneborn and Rieck Ltd.)	30
Ethyl acetate	70

For silk screen printing there may be used:

	parts
nitrocellulose 60/330	60
Aerosol 3000 (silica flour)	10
Iso octyl alcohol	30

A transfer material so made may be applied to fabric by the general methods indicated above.

The fabric carrying the transferred design may be washed by hand or in boiling water and in the presence of soap or conventional washing powders and detergents, and the washed products may be spun dry or wrung out without damage to the designs.

The washed fabric may be ironed but a cool iron should be used.

WHAT WE CLAIM IS:—

1. A transfer material which comprises a non-thermoplastic carrier sheet and, in order thereon, an overall layer of thermoplastic water-insoluble film, an ink design in an ink based on a thermoplastic resin, and, localised on the surface of the assembly at an edge thereof, an area of non-transferable, non-thermoplastic material.

2. A transfer material according to claim 1 wherein the thermoplastic film is of polyethylene.

3. A transfer material according to claim 1 or 2 wherein there is located between the thermoplastic water-insoluble film and the ink design, a clear layer of a thermoplastic or thermosetting resin.

4. A transfer material according to claim 3 wherein the clear layer is of a synthetic linear polyamide resin.

5. A transfer material according to any of claims 1—4 wherein the carrier sheet is bleached plasticised glassine paper.

6. A transfer according to any of claims 1—5 wherein the non-transferable, non-thermoplastic layer is cellulose based.

7. A transfer material according to claim 1 and substantially as hereinbefore described with reference to the foregoing specific Example.

8. A method of applying a design to a fabric which comprises applying to the fabric a transfer material according to any of claims 1—7 with the carrier sheet outermost, applying heat and pressure over the area of the transfer and then, while the assembly is still hot, stripping away the carrier sheet.

9. A method according to claim 8 wherein heat and pressure are applied at a temperature of 150—220°C and 5—50 psi respectively.

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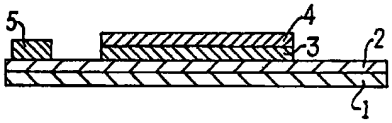
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